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ABSTRACT

To investigate whether and how commercial software products for literature do or could complement response-based pedagogy, an extensive review of existing applications was undertaken. Teams of language arts teachers, both preservice and inservice, met weekly to initially discuss and share observations regarding the potential of multimedia to support and enhance response-based approaches to the teaching and learning of literature. Preparation for weekly discussions entailed reading research from both the multimedia and response-based literatures, and examining multimedia applications across content domains. This approach was based on the belief that building up a sense of multimedia's potential was best achieved by first establishing general knowledge as to what the technology is capable of, and using this as a point of departure for participants to envision what response-based multimedia would ideally look like. That is, the researchers did not want teachers' attitudes toward multimedia and the teaching of literature to be influenced either positively or negatively by first examining literature applications. On the contrary, the researchers wanted the teachers to dream freely. A total of 49 multimedia applications for literature were reviewed by teacher/reviewer teams--24 applications were designed for elementary students, 25 for secondary. Through this process, teachers developed a list of desirable features for their ideal applications. Results, which were copious, were divided under headings on critical issues and "desiderata" (which lists 11 features that teachers would desire in multi-media services). (Contains 2 tables of data and 11 references.) (TB)

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Carla Meskill
Karen Swan

National Research Center on
Literature Teaching & Learning
UNIVERSITY AT ALBANY • SUNY

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Carla Meskill
Karen Swan

National Research Center on Literature Teaching and Learning
University at Albany
State University of New York
1400 Washington Avenue, Albany, New York 12222

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Roles for Multimedia in the Response-Based Literature Classroom

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INTRODUCTION

Imagine a tool, a database of information, whose use promotes and supports rich conversation around works of literature; a tool that helps students make connections, build meaning, and articulate their thinking. Imagine a class of twenty-seven high school students assigned to read Shakespeare for the first time. A large video monitor at the front of the classroom displays a vivid color image of pastoral Stratford-on-Avon. Their teacher selects many additional still images and video sequences from a computer-generated menu to facilitate a discussion that sets the scene for the play. These images cue and serve to illustrate students' discourse. The teacher may select scenes that depict the life and times of the playwright, the *misé en scene* for a variety of stage productions, thematic works of art, segments from today's media, or sample treatments of the work in contemporary film.

Two days later, small groups of students are seated in front of a smaller version of this tool, engaged in lively talk. One member clicks the mouse to access video, audio, text, and graphics, which group members work to relate to the play they are in the process of reading. Their task is to select and assemble such elements into a class presentation concerning an aspect of the play. If the group becomes curious or puzzled, they can access and discuss elaborated explications. They can defend their interpretations and negotiate corresponding supporting materials.

Four days later, once the small groups have made their presentations with their assembled media, a pair of students returns to the tool to review all the class presentations. They type in comments and questions that occurred to them after their class discussion and work on their next project. Their teacher and the other students will read and respond to these at a later time. The conversation will continue.

This report explores the potential of a complementary relationship between the learning and teaching of literature and characteristics specific to multimedia instructional delivery systems. Our research is designed around and is driven by the assumption that the medium potentially represents a powerful means of promoting and enhancing the processes of literary understanding. We believe, in other words, that the technology can play a role in enhancing the activities of student-centered, response-based classrooms. As an initial step towards analysis of the technology's real and potential role in literature teaching and learning, we undertook a comprehensive review of the design strategies employed in both commercial multimedia applications. Through this review process, we have attempted to determine

whether the design of current multimedia applications reflects state-of-the-art theory and pedagogical approaches to learning and teaching. The outcomes of these reviews are described in detail in Swan and Meskill (1995). The present report specifically addresses issues related to actual classroom usage of multimedia in respect to response-based practice. Participating teacher/reviewers examined applications with possibilities for response-based classroom usage as an underlying goal for their activity. A collection of potential scenarios for using multimedia in the response-based classroom consequently emerged. These scenarios are also outlined and discussed.

BACKGROUND

There is new emphasis—in education in general and in language arts instruction in particular—on critical and creative thinking. Importance has shifted from a need to know information onto the need to know what to do with new forms of access and retrieval; that is, today's student is in need of critical, analytical, and creative thinking that can be applied to a world that continues to grow more complex and information dependent (Papert, 1993). As such, traditional emphases on procedural problem-solving practices need to be supplemented with less confining, more creative approaches to dealing with complex phenomena. Such forms of thinking are fluid and involved, not methodical and detached (Dreyfus & Dreyfus, 1986). They develop through engagement in meaningful tasks and activities undertaken in supportive social contexts (Vygotsky, 1978). In short, there is a growing need in new, information-based societies for involved, well-groomed intuitions, which are applied to increasingly novel and complex worlds. The facility to employ at the appropriate time, in the appropriate context, and in the appropriate manner critical and creative analyses is an important entree into information-based societies of the future.

Response-based practices in literature teaching and learning are responsive to this need for new forms of thinking and learning. For example, students in the response-based classroom learn not just about literature, but also about how to render their reading experience into literary understandings—understandings that are inward, divergent, and, as such, supportive of the development of critical and creative thinking about worlds both fictional and real (Langer, 1990). Through class discussion, journal writing, and related response-based activities, students' responses to what they read become articulated, valued, and refined; students' ability to think and speak about their responses, moreover, not only enhances their literary experience, but contributes to the development of linguistic and cognitive skills across content areas (Langer, 1993; Miller, 1993).

In some learning situations, the learner is expected and even required to adopt prevalent existing knowledge structures; in others, she is to demonstrate creativity and insight. Machine usage in the classroom—particularly the use of computers—has historically matched the former set of expectations. The present inquiry focuses on the latter. If machines in learning

are not to be thought of as knowledge domains against which students are pitted and expected to acquire the correct structure of information, it is because the current goals of learning and teaching no longer match this concept of instructional technology. It is desirable for instructional technology to play a fundamental role as learning tool of the future; however, in most instructional software paradigms, as well in as the contexts in which software gets used, there is a woeful mismatch between theory and practice (Jones & Mercer, 1993; Papert, 1993; Stevens, 1989).

This mismatch is reflected in the results of our multimedia applications review and critique. That is, when examined within a response-based framework, systematic multimedia software reviews indicate that the majority of packages currently on the market for literature consistently fall short of what would optimally complement response-based practices. In short, rather than reflecting instructional paradigms that are rooted in constructionism, cooperation, and socially mediated learning, commercial applications tend to adhere more to the information brokerage tradition with meaning emanating from text on the screen rather than from students themselves (see Swan & Meskill, 1995).

Regardless of the shortcomings of these commercial packages, teachers involved in this project's applications review process were able to (1) imagine roles for the technology and accompanying software characteristics that would be supportive of response-based practices; and (2) generate scenarios for using many of the commercial applications reviewed, despite their design weaknesses. In other words, with some teacher ingenuity and preparation, even the most limited, text-as-knowledge–based applications might be used effectively to elicit and support students' responses and the development of literary understandings. This report first discusses use of multimedia technology in the response-based classroom and how particular usage paradigms are consonant with and complementary to response-based practices. The intersection of usage and desirable system features is then taken up, followed by discussion of specific product characteristics deemed desirable by teacher/reviewers and whether multimedia products now on the market include such characteristics. Finally, issues are raised concerning the adaptation and integration of instructional technology in the response-based classroom and specific usage paradigms.

RESPONSE-BASED ROLES FOR MULTIMEDIA

Multimedia—a computer-based technology that integrates text, graphics, animation, audio, and video—are rapidly gaining in popularity as instructional media in the education sector. Their role in the language arts curriculum has, until very recently (that is, until the ready availability of commercial products), been limited to experimental prototypes. Now, with applications being marketed by large publishing houses, use of multimedia materials for literature in public schools has become feasible. We will argue that in response-based

contexts, it is also desirable (with a number of caveats, chief among which is the role in which the technology is cast in the classroom).

In its potentially supportive role in the literature classroom, the technology can be seen as complementing and enhancing the following phases for developing literary understandings as outlined by Langer (1991) .

Before the Literary Experience

Easing Access before Reading

As a presentation system, multimedia can provide a tool for easing entry to a literary work. This can be accomplished when software provides access to supporting visual/aural information, thought-provoking images, and key information. The teacher, alone or with the help of students, can tailor and utilize such materials in consort with the front-end, discussion-based work promoted by Langer.

Creating the Literary Experience

Multimedia can serve to shape the social context in which literary works can be explored/experienced with others. Students and their teachers have a central source of images, sounds, and text that can stimulate and facilitate the sharing of responses. The technology can be used as a springboard for shaping roles and discourse. In other words, multimedia can play the role of catalyst, thereby stimulating interaction and an ambiance conducive to collaboration and sharing of experiences.

After the Literary Experience

Inviting Understandings/Developing Interpretations

Through multimedia, students can be encouraged to build meaning and develop understandings. Given aural and visual tools with which to explore, expand, clarify, and modify students' understandings, the technology can be cast in the role of support system for students as they develop and share their interpretations.

Multimedia can also potentially assist students in considering multiple perspectives; that is, students can see and experience the responses of others to the same text. Varying interpretations can be accessed through video, audio, graphics, and text. As such, multimedia have the potential to invite exploration of multiple perspectives.

Making Connections (Personal, Literary, and Cultural)

Again, students can be permitted and encouraged to connect what they read and discuss to their own experiences. They can use multimedia tools to construct as many linkages as they can support and defend.

Sharing These, Taking a Critical Stance

With a good play or film, it is in the lobby or a few days later that we encounter aspects of the work and reconfigure initial meanings into thoughtful, deeper understanding. As with plays or films or even nonfiction life events, experience with a literary text is similar. There is the initial reading, during which visions and complex webs of empathies are construed and lived through. One is immersed and, as such, engaged in a fictional world uncritically. It is some time after the initial immersion experience that we can enjoy stepping back and examining in a less holistic and more analytical way the nature of that experience and the craft that evoked it. Engaging in this examination process alone is historically the norm; sharing the experience with others—as in response-based literature teaching practice—can only widen and deepen one's own understanding.

Multimedia technology can serve response-based practices as a vehicle that facilitates and makes more powerful the sharing of experiences and understandings gained through them. Multimedia can, for example, supply tools and large stores of information that can be used when students cooperatively construct meanings around the texts they are reading.

Exploring the Author's Craft

Multimedia can supply students with a magnifying glass (among other tools) with which to examine literary works, and, with the aid of multiple forms of on-line assistance, can help students make sense of a writer's artistic crafting of a work through access to a wealth of available craft commentary.

Stocktaking

To "leave doors open" once a piece of literature has been read and discussed, multimedia can serve as a place to return to in order to continue to probe and make sense of a work. As such, multimedia can provide the kind of independent reexamination that promotes independent as well as socially constructed envisionment building.

Traditional instructional approaches to literature teaching rely heavily on the teacher to open doors to what is perceived as some singular, hidden meaning residing in the literary text. Teachers in turn rely on texts and on students' own capacity to enter texts, to become initiates. Response-based practice reverses this process, relying instead on the students to build meaning. Multimedia represent a tool with which these meanings can be discovered and developed, a potential means of access to a text's multiple dimensions through which students—with their teacher, with peers, and independently—can enter, and where meaning can be built rather than delivered. The technology has the potential to serve as an environment for exploring one's own interpretations, constructing one's own meanings, and negotiating and/or defending these with peers. Because it offers student-centered experiences, it can encourage constructive discourse and empower independent, critical thinking.

In theory, then, the technology can be viewed as a desirable complement to the response-based classroom when cast in the role of catalyst and tool. Access to supporting media, in tandem with the availability of powerful tools, render multimedia an object to think with, to talk around and through, rather than an object from which sanctioned knowledge emanates. This project set out to determine what combinations of multimedia design features best constitute response-based tools of this kind, and whether such features were characteristic of commercially produced language arts software for literature. Such features, which we call "desiderata," are discussed first in the context of application reviews and subsequently within an idealized context of response-based practice.

METHODOLOGY

In order to investigate whether and how commercial software products for literature complemented response-based pedagogy, an extensive review of existing applications was undertaken. Teams of language arts teachers, both preservice and inservice, met weekly to initially discuss and share observations regarding the potential of multimedia to support and enhance response-based approaches to the teaching and learning of literature. Preparation for weekly discussions entailed reading research from both the multimedia and response-based literatures, and examining multimedia applications across content domains. This approach was based on the belief that building up a sense of multimedia's potential was best achieved by first establishing general knowledge as to what the technology is capable of, and using this as a point of departure for participants to envision what response-based multimedia would ideally look like. That is, we did not want teachers' attitudes toward multimedia and the teaching of literature to be influenced either positively or negatively by first examining literature applications. On the contrary, we wanted teachers to dream freely. These initial discussions, then, centered on the potential match and mismatch of system features with theory and practice regarding response-based practices. Through this process, participants generated a list of desirable features (desiderata) for their ideal applications. These desiderata are detailed and discussed in the following section.

As more applications, both for literature and other content areas (foreign language and fine arts, for example), were studied and discussed, participants also developed software review criteria to guide their own and other teachers' examination of what they came to determine to be critical features of software in general (surface features) and literature applications in particular (pedagogical features). Roughly drafted review criteria were the focus of team meetings and were used by the teachers in subsequently examining literature-specific applications. As more applications were reviewed and discussed, evaluation criteria were redrafted and refined. This was a lengthy and stimulating process, as it involved the discovery of design approaches underlying software functions. Software features were frequently in

direct contrast with what the team had determined as desirable within a response-based pedagogical framework. This contrast is presented in the following section.

While reviewing applications, eight members of the teacher/reviewer teams also decided to field-test software packages of their choosing in school classrooms and laboratories. Individuals, pairs, and small groups of students were videotaped using materials and interviewed regarding their reactions to them. Results of these observations and student reactions to the trials will be discussed within the contexts of the desiderata and the suggested classroom usage paradigms that evolved.

RESULTS

Critical Issues

1. General Characterisitics

A total of 49 multimedia applications for literature were reviewed by teacher/reviewer teams using assessment criteria in their final form. The applications were located through up-to-date software catalogs and are representative of what is on the market at the time of this writing. Twenty-four of the applications were designed for elementary students, 25 for secondary. The majority of the programs reviewed accessed media from a CD-ROM disk (31). Some used a combination of CD-ROM and laserdisc (10). Only 4 applications used floppy disks alone. The majority of programs (24) were offered for dual platforms (Macintosh and IBM-compatible computers), with the remainder evenly split between applications designed exclusively for the Macintosh (11) and those designed exclusively for IBM-compatibles (10). In general, the cost of these programs ranged between $25 and $100 for straight CD-ROM or floppy-disk offerings, and between $200 and $300 for programs that included videodiscs. Two more-extensive programs were considerably more expensive.

At the elementary level, the bulk of applications reviewed could be categorized as "talking books"; that is, they offered little more than novel ways of turning pages electronically and activating animations within illustrations. No elementary application invited student response either on- or off-line. In a few cases children could cut, paste, color, and print pictures related to the story. One gave children the option of recording sound to accompany pictures. One application was a game, another a story-starter tool for student-generated stories. All programs included audio, most of which was comprised of text read aloud.

At the secondary level, in addition to a number of applications that, like the elementary software packages, were no more than books on computer, four categories of application emerged out of the review process. First, the majority of applications reviewed were chiefly *databases* appended to a text or collection of texts. Included in such databases was historical, biographical, and background information concerning the author and piece that pertained chiefly to craft. Two applications reviewed were categorized as *hypertexts*. These programs

provide visual links between text entries, links that typically represent relationships between the literary text and historical and craft commentary. The third category, *hypermedia,* describes software that links the text of a specific work with video segments from videodiscs. Finally, two applications were classified as *problem-solving games* loosely connected with literary texts.

2. Access

A critical issue that emerged through these processes was that of access. In discussions of multimedia's potential to enhance the literary experience, a key attribute of the technology was that it could potentially provide both teachers and students access to a wide range of information in the form of sounds, images and text that could be used to complement response-based classroom practices and the goal of developing literary understandings. Types of access deemed critical for multimedia are:

- Access to the literary text itself for annotation, cutting, pasting, and commentary
- Access to multiple perspectives of a single literary work
- Access to tools with which to build individually or group-constructed representations of understandings developed around a piece of literature
- Access to a dialogic space within which students, through interpersonal communication, develop understandings.
- Access to an environment and tools for personal creativity

3. Physical configurations

Elemental to initial considerations of multimedia's potential was the sociophysical configuration of the machine in the teaching and learning process. Based on their beliefs that success of the technology is more contingent on usage and classroom practices than on specific characteristics of the technology, the teacher/reviewers added the dimension of physical configuration into the analysis of system features. Desirable features are consequently linked to these possible classroom configurations: (1) teacher tool (as presentation and stimulus for whole class discussion); (2) tool for individual students (as self-study/reflection); and (3) tool for pairs or small groups (to provoke, sustain, and enrich collaboration among peers).

The access construct and consideration of the sociophysical context underly the development of a list of desirable features—desiderata—against which commercial products were evaluated. The project's list of desirable features for multimedia and literature (Tables 1 and 2) is the outcome of initial team investigations, reflections, and group discussions. It should be noted that these desiderata are comprised of characteristics that pertain to an ideal multimedia application; not, as is reflected in the vertical columns, of any single, existing product. Nor should these desiderata be viewed as objective attributes; they were, rather, conceived of and used as heuristics by which applications could be considered in terms of classroom use. In other words, they were developed and used as review tools—a collection of lenses through which critical aspects of software products could be viewed within a

response-based framework. The desiderata are not, therefore, necessarily designed to isolate and evaluate single, distinct features, but to provide a range of perspectives from which the software can be studied. For example, an objective attribute such as being able to show relationships between texts, between texts and images, and/or among texts, images, and sounds on the computer screen can serve many functions in the response-based classroom. That feature cuts, therefore, across artificial boundaries among the desiderata: Intertextuality and Juxtaposition (1), Facility to Share Responses (2), Facility to Support Responses (3), and Facility to Make Links (4), if not others.

The Desiderata

1. Transparent Navigation

In reviewing the 49 multimedia applications, reviewer teams found very early on in the process that if it were not clear how one moved through the application—if one was easily disoriented—then both students and teachers would not only become frustrated, but the awkwardness of a transparent authorial voice (that of the software designer who constructed the self-conscious navigational system) could potentially interfere with and even drown out those of students and teachers. In short, participants wished to know where they were, where they had been, how to get to where they wanted to go, and how to work with materials the way they desired. Participants reported that if movement within the program was not clear and intuitive, other valuable attributes of the software would become overshadowed by cumbersome access. Conversations concerning content and ideas, it was felt, would be hampered by talk aimed at troubleshooting the software.

During field-test trials with select applications, this was indeed the case. Unclear navigation was a tremendous source of distraction for pairs and small groups; that is, rather than focusing on content and engaging in meaningful dialogue when unclear as to how to move through materials and accomplish tasks, interaction became characterized by monosyllabic advice, commands, and confusions. This impoverished discourse also focused on the machine, not the content.

As Tables 1 and 2 indicate, out of 49 applications reviewed only 9 were considered unclear in terms of user navigation. For the majority of applications reviewed, then, moving through materials and accomplishing tasks is not hindered by poor navigational features.

2. Intertextuality and Juxtaposition

A desirable attribute to support response-based practices is that an application have some mechanism whereby elements from a variety of media (video, text, graphics, audio) can be displayed to represent contrasts, similarities, and/or relationships between and among texts. The facility to juxtapose various meaning representations on the computer screen, it was felt, was a potentially powerful use of multimedia for all three classroom configurations. As a presentation device, such a system could be used to illustrate whole-class discourse and,

Table 1. Summary of Response-Based Multimedia Features: Elementary.

	Applications											
Desiderata	1	2	3	4	5	6	7	8	9	10	11	12
1. Transparent Navigation	●	●	●	●	●	●	●		●	●	●	●
2. Intertextuality and Juxtaposition												
Teacher Tool	●				●				●		●	●
Individual Tool	●		●		●				●		●	●
Pair/Group Tool	●		●	●	●				●		●	●
3. Facility to Share Responses												
Teacher Tool					●				●		●	
Individual Tool					●				●		●	
Pair/Group Tool									●		●	
4. Facility to Support Responses												
Teacher Tool					●							
Individual Tool					●							
Pair/Group Tool					●							
5. Facility to Make Links												
Teacher Tool			●						●		●	
Individual Tool			●	●					●		●	
Pair/Group Tool			●	●					●		●	
6. Stimulates Envisionment												
Teacher Tool			●									
Individual Tool			●									
Pair/Group Tool			●									
7. Access to Multiple Perspectives												
Teacher Tool			●		●							
Individual Tool			●		●							
Pair/Group Tool			●		●							
8. Stimulates Dialogue												
Teacher Tool	●		●	●	●	●			●	●	●	
Pair/Group Tool	●		●	●	●	●			●	●	●	
9. Promotes Student Ownership												
Teacher Tool			●		●							
Individual Tool			●		●							
Pair/Group Tool			●		●							
10. Activates Background Knowledge												
Teacher Tool	●		●		●							
Individual Tool	●		●	●	●				●		●	
Pair/Group Tool	●		●	●	●				●		●	
11. Facility to Explore Author's Craft												
Teacher Tool												
Individual Tool												
Pair/Group Tool												

(continued)

Table 1. (*continued*)

Desiderata	Applications 13	14	15	16	17	18	19	20	21	22	23	24
1. Transparent Navigation	●	●		●	●	●		●		●	●	●
2. Intertextuality and Juxtaposition												
Teacher Tool	●		●			●		●	●	●		
Individual Tool	●	●	●	●		●		●	●	●		
Pair/Group Tool	●	●	●	●		●		●	●	●		
3. Facility to Share Responses												
Teacher Tool			●			●						
Individual Tool			●			●						
Pair/Group Tool			●			●						
4. Facility to Support Responses												
Teacher Tool						●						
Individual Tool						●						
Pair/Group Tool						●						
5. Facility to Make Links												
Teacher Tool	●		●			●			●			
Individual Tool	●		●	●		●			●			
Pair/Group Tool	●		●	●		●			●			
6. Stimulates Envisionment												
Teacher Tool						●	●					
Individual Tool						●	●					
Pair/Group Tool						●	●					
7. Access to Multiple Perspectives												
Teacher Tool			●			●						
Individual Tool			●			●						
Pair/Group Tool			●			●						
8. Stimulates Dialogue												
Teacher Tool	●		●		●	●	●	●	●	●	●	●
Individual Tool	●		●		●	●	●	●	●	●	●	●
9. Promotes Student Ownership												
Teacher Tool	●					●	●					
Individual Tool	●					●	●					
Pair/Group Tool	●					●	●					
10. Activates Background Knowledge												
Teacher Tool			●			●	●					●
Individual Tool			●			●	●					●
Pair/Group Tool			●			●	●					●
11. Facility to Explore Author's Craft												
Teacher Tool												
Individual Tool												
Pair/Group Tool												

Table 2. Summary of Response-Based Multimedia Features: Secondary.

	Applications												
Desiderata	1	2	3	4	5	6	7	8	9	10	11	12	13
1. Transparent Navigation	●	●	●	●	●		●	●			●	●	●
2. Intertextuality and Juxtaposition													
Teacher Tool					●		●					●	
Individual Tool		●	●	●	●	●	●					●	●
Pair/Group Tool		●	●		●	●	●					●	●
3. Facility to Share Responses													
Teacher Tool											●	●	
Individual Tool					●				●		●		
Pair/Group Tool									●		●		
4. Facility to Support Responses													
Teacher Tool							●	●			●	●	
Individual Tool				●			●	●	●		●	●	
Pair/Group Tool							●	●	●		●	●	
5. Facility to Make Links													
Teacher Tool					●		●					●	
Individual Tool		●		●	●		●		●			●	
Pair/Group Tool		●			●		●		●			●	
6. Stimulates Envisionment													
Teacher Tool		●					●					●	
Individual Tool		●		●			●					●	
Pair/Group Tool		●		●			●					●	
7. Access to Multiple Perspectives													
Teacher Tool							●						
Individual Tool							●	●		●			
Pair/Group Tool							●	●		●			
8. Stimulates Dialogue													
Teacher Tool		●			●		●					●	
Pair/Group Tool		●			●		●					●	
9. Promotes Student Ownership													
Teacher Tool		●			●		●				●		
Individual Tool		●		●	●		●				●		
Pair/Group Tool		●			●		●				●		
10. Activates Background Knowledge													
Teacher Tool		●			●		●				●	●	
Individual Tool		●		●	●		●				●	●	
Pair/Group Tool		●			●		●				●	●	
11. Facility to Explore Author's Craft													
Teacher Tool							●				●	●	
Individual Tool			●				●		●	●	●	●	●
Pair/Group Tool			●				●		●	●	●	●	●

(*continued*)

Table 2. (*continued*)

Desiderata	Applications 14	15	16	17	18	19	20	21	22	23	24	25
1. Transparent Navigation		●	●	●	●	●	●		●	●	●	●
2. Intertextuality and Juxtaposition												
Teacher Tool		●	●	●		●		●	●	●	●	●
Individual Tool		●	●	●		●		●	●	●	●	●
Pair/Group Tool		●	●	●		●		●	●	●	●	●
3. Facility to Share Responses												
Teacher Tool				●	●					●	●	●
Individual Tool		●			●							
Pair/Group Tool		●			●							
4. Facility to Support Responses												
Teacher Tool	●		●	●			●			●	●	●
Individual Tool	●		●	●			●			●	●	●
Pair/Group Tool	●		●	●			●			●	●	●
5. Facility to Make Links												
Teacher Tool			●						●		●	●
Individual Tool			●						●		●	●
Pair/Group Tool			●						●		●	●
6. Stimulates Envisionment												
Teacher Tool		●	●	●					●	●	●	●
Individual Tool		●	●	●					●	●	●	●
Pair/Group Tool		●	●	●					●	●	●	●
7. Access to Multiple Perspectives												
Teacher Tool			●									●
Individual Tool	●		●									●
Pair/Group Tool	●		●									●
8. Stimulates Dialogue												
Teacher Tool			●	●		●		●	●	●	●	●
Pair/Group Tool			●	●		●		●	●	●	●	●
9. Promotes Student Ownership												
Teacher Tool			●				●			●	●	●
Individual Tool			●				●			●	●	●
Pair/Group Tool			●				●			●	●	●
10. Activates Background Knowledge												
Teacher Tool		●	●	●		●			●	●	●	●
Individual Tool		●	●	●		●			●	●	●	●
Pair/Group Tool		●	●	●		●			●	●	●	●
11. Facility to Explore Author's Craft												
Teacher Tool		●	●			●				●	●	
Individual Tool		●	●			●				●		●
Pair/Group Tool		●	●			●				●	●	●

through the use of contrasting text and images, to support and enrich multiple envisionments and interpretations. Likewise, for pairs and small groups, assembling, comparing, and contrasting text and images to support interpretations would enhance student-to-student dialogue around both the process of interpretation (responding) and responses as they are instantiated in a visual format. For individual users, such tools would support the construction of more-individualized and reflective representations of responses to text.

As is apparent in Tables 1 and 2, the majority of applications reviewed possessed neither the facility to represent nor the facility to manipulate multiple texts and images on the computer screen—tools that would facilitate seeing relationships by juxtaposing and relating diverse elements. Applications noted as possessing this attribute may allow visual links, but these links are typically limited to pieces of text; they do not include sound and images.

3. Facility to Share Responses

It was strongly felt that one of the most powerful features of the technology that supports response-based practices was the potential capability to facilitate the sharing of student responses on-line. That is, the technology can support written responding—similar to the use of response journals—and can also broadcast these reflections, thus facilitating multiple annotations and commentary. It was felt that multiple threads of conversations around students' and teachers' reading experiences can be initiated and sustained in a technology-based environment, conversations that are not otherwise possible—or at best cumbersome—in traditional paper-and-pen formats. Our teams envisioned students engaging in ongoing on-line conversations around the literature they were currently reading or that they had already read. Such conversations were perceived as potentially valuable for all three pedagogic configurations as well. As a teacher tool, lines of discussion could be traced as a whole group and thus elaborated on in real time. Smaller groups might also benefit from using text conversations as a catalyst for further inquiry, response, and reflection. Finally, individual review of and participation in on-line conversations might potentially meet the needs of students who may have a lot to say about their experiences with texts, but who are less forthcoming with their responses in live classroom contexts.

Software programs that included note-taking capability typically limited student input to an individual's notes that could not be broadcast and therefore could not be shared with other members of the reader community. In addition to the "notepad" function of several applications designed for secondary students, story-starter writing spaces were sometimes provided to elementary students (e.g., illustrations were provided, about which children were to compose). It is interesting to note that in two field trials with such software, children's writings about these illustrations were limited to precise descriptions of the picture. Where such tools would ideally be provoking critical and creative thought, then, they are still, at least in these limited trials, insisting on singular interpretations.

4. Facility to Support Responses

The empowering aspect of adding visual support to one's imaginings and understandings has long held appeal in the language arts classroom (Purves, Rogers, & Soter, 1990). An aspect of response-based practices that the group felt multimedia would nicely complement, therefore, is the process of defending individual or group interpretations. With a sufficiently extensive database of multimedia material, multiple interpretations could be illustrated to support oral and/or written commentaries that reflect student envisionment. For the whole-class configuration, review teams envisioned students—alone or in pairs—using the multimedia system to provide visual support to their responses and interpretations. Small groups could collaborate in the construction of these illustrations; individual users could review and annotate these. In other words, the possibility of providing tools for students to use in creating visual representations of their interpretations and in turn defending these was often cited.

The software applications reviewed rarely possessed the facility for users to create original presentations. The 2 elementary applications marked as possessing this feature offered story-starter programs, where students were prompted to compose a story. The 13 secondary applications designated as having this attribute had notepads, and in some cases annotation capabilities, whereby students could link their comments to the actual work of literature. Cutting and pasting materials from a visual/aural database and assembling these, however, was not an option for students or teachers.

5. Facility to Make Links

A key tenet of response-based approaches to literature is that readers (students) make connections between what they read and their own knowledge and experiences. Making such connections is potentially encouraged and supported by multimedia tools that allow for visual linking on the screen; in other words, there is potentially an analogous process of making connections on-line. Visual representations of the connections students make (again—video, text, audio, graphics, or any combination) are valuable both in terms of the process involved in constructing them and their role in shared discourse that reflects, enhances, and focuses student responses.

Reviewers found that few applications overtly provoked students to make connections between what they were reading and their own experiences. Those applications that did attempt this did so with open-ended, "think about" questions interspersed within the software program. One additional approach was to include these kinds of questions in an accompanying teacher's manual. In this way, the teacher was guided to cue student connection-making off-line.

6. Stimulates Envisionment

As a presentation device (whole-class tool), the teacher could use the system to display interpretative works of art as examples of others' responses to texts they have read. The provision of tools with which students can create, edit, refine, and reinterpret representations of their personal envisionments using the full range of available media was deemed highly desirable. The benefits from the social collaboration required by the creative construction process are clear, as is the value of an individual student using tools to represent interpretative visions of the text being read.

As discussed in the context of Desideratum 4 (Facility to Support Responses), tools with which students and teachers can build visual representations and interpretations of the meanings they make from text are rare in the applications reviewed. Where software application screens can be used "as is" for whole-class presentation, facilities such as cut, paste, draw, and annotation were lacking—although some software programs allowed for individual note-taking (see Desideratum 3—Facility to Share Responses).

7. Access to Multiple Perspectives

A key tenet of response-based approaches is the open-ended nature of text as regards individual interpretation. A desirable feature for multimedia applications for literature, then, is that no single authorial voice predominate. Instead, it was felt that multimedia technology could lend itself well to furnishing multiple voices to provide both commentary on the text and individual experience with the text.

In only one case were such commentaries an integral part of a literature application. In this one case, commentaries consisted of reflective monologues that were linked directly to specific passages within the focal work. The remaining applications failed on this criterion, with singular interpretations or pieces of knowledge typically emanating from the text as though only one perspective were possible.

8. Stimulates Dialogue

An ideal role for multimedia in response-based classrooms is as a catalyst for discussion and, consequently, socially mediated discovery. Differing points of view are a source of delight, and divergent imaginings are the optimal format for discovery and growth among conversation participants. In other words, software ought to be designed to stimulate student-to-student and students-to-teacher discourse around literature. In the majority of cases, applications were built with a single user in mind; that is, format, prompts, and questions were designed to shape and sustain a single-user–plus–machine interactional framework, and, as a result, were not intended to stimulate off-screen talk among students. It was felt, however, that in a number of cases, the availability of visuals to support the text could serve as a springboard for discourse when displayed on a large monitor in whole-class formats. Moreover, the possibility of assigning carefully crafted pair and small-group tasks that require

students to make use of information within applications could potentially cast the technology in the role of discourse catalyst. As an information resource, the system could serve as the focus of meaningful talk about texts students have read.

In our few field observations of students using these programs, discourse between and among students in pairs and threes was limited. Talk tended to center on software and hardware functions, not on the literature being read. Moreover, exchanges that did occur tended to be limited to single word commands or pieces of advice about what to do next. In the case of elementary programs with engaging animations, children made periodic comments of the "ooh" and "aah" variety when the animations were accessed. Sustained involved interaction around focal texts was absent in these trials.

9. Promotes Student Ownership

Teams felt strongly that applications that represented canonized text, knowledge, and interpretations were antithetical to the goals and process of response-based practices. That is, the design of the majority of applications reviewed transmitted a sense of "here is the text," with little or no provision for inviting students to "step in" (Langer, 1990). Without explicit provision for student entry into the fictional world, the technology can inhibit rather than induce imaginings. Features that could counteract the technology (and literary text) from being cast in this role would consist of tools for students to annotate, mutilate, and build discourse threads of their own around the work.

In very few cases were tools available that would allow students to take ownership and consequently engage in the processes of discourse and discovery.

10. Activates Background Knowledge

One of multimedia technology's strongest features is its capacity to store and display large amounts of information—textual, aural, and visual. As such, the technology is well suited to stimulating student envisionment. It was felt that as a whole-class presentation device, a system could serve to activate student schema as well as to fill gaps in students' experiences in the world. For example, children in urban schools who may never have experienced fences other than those made of galvanized steel would benefit from access to visuals representing those made of wood and stone in rural settings.

In some cases, applications for secondary students that we reviewed provided large stores of supporting information that could be used for these purposes. In others, the text and its accompanying illustrations were the sole focus.

11. Facility to Explore the Author's Craft

As noted above, one of multimedia technology's strongest suits is its capacity to make large stores of information available to the user. The addition of craft commentary in a range of media formats (texual, visual, aural) to which students have ready access during the various phases of engagement with the literary work was considered a logical and attractive feature.

When commentary on an author's craft was included in an application (secondary only), this information consisted of (1) pointers to literary devices within the text and (2) definitions of literary terminology. In only one case was craft commentary provided from a range of perspectives by individual speakers on video. Some applications offered "hot words"—specific words or phrases in the text were highlighted (indicating more information in reference to them was available by clicking the mouse), and corresponding commentary and definitions popped up. While the ready access to such information is attractive, teams were troubled by the pedantic nature of both the kinds of information provided and the manner in which it "sprang forth" from the text as if forever fixed and inextricable. The alternative approach, they proposed, was to provide students with tools with which to first determine and label literary devices and then to attach these themselves to relevant portions of the literary work. This, they felt, was more in keeping with response-based practices in that emphasis should be placed on the exploration of craft, as opposed to the reading of encyclopedic entries.

After carefully considering what multimedia can potentially offer response-based classroom processes, and then applying a set of desirable features against a representative sample of commercial multimedia, our teams of teacher/reviewers found that applications as a whole are deficient in many ways. Overall, the aggregate of qualities deemed desirable cast the technology not merely in the role of source by which students merely experience text differently—"electronically"—that is, not just a delivery system for literary texts. This would be the least desirable of roles for the technology, given a response-based framework for teaching and learning.

CAN THESE PACKAGES BE USED ANYWAY?

As teacher/reviewers imagined students' work around multimedia, they saw students bringing their diverse knowledge and experiences to the task, building on it collaboratively to enrich their own understandings of the text and its relationship to their own experiences. With some guidance, students' experiences with multimedia would help them extend their interpretive horizons, explore possibilities, and gain additional knowledge to augment their developing understandings. They would also be learning to respect the diverse opinions and alternative interpretations of their peers, even as they were helped to construct and defend interpretations of their own.

If this is one vision of the possibilities of multimedia, reviews of existing applications reveal a serious problem: the power of the technology far outpaces the conceptualization of literature teaching and learning that is at the core of its educational uses. Software attributes complementary to response-based practice, in other words, are sorely lacking in the representative sample of products we reviewed. Neither recent theoretical conceptualizations of literature in the language arts, nor the twenty-year-old constructivist movement in

educational research and practice that spawned them, are evident in these materials. Instead of assuming a contemporary theoretical and practical framework that treats meaning development as a process that is influenced by an interaction between personal and group experience and the text, most current applications treat the text as information, an object to be learned, parsed, and recalled. Thus, in publishers' attempts to provide a wealth of options, activities, and knowledge-sources, the reader's interpretations and the critical thinking involved in weighing possible interpretations are often co-opted. Rather than serving as tools and catalysts for critical and creative discourse, with few exceptions the dominant paradigm for the software reviewed was one of sanctioned and delivered information.

As can be gleaned from the table of applications reviewed (Tables 1 and 2) and the preceding discussion, the dominant paradigm for multimedia software design for literature currently lacks those features deemed desirable and supportive of response-based language arts classrooms. Ideally, then, applications would possess attributes they currently do not have. However, through discussion, reflection, and some field-tests, our teams of teacher/reviewers concluded that teachers and their students could use these products with some success, given a number of caveats. While reviewing the commercial applications, teams were also asked to speculate on specific uses for the software. Usage observations and projected scenarios are discussed in the following section.

As discussed earlier, our teacher/reviewer teams felt that successful uses of multimedia materials in the classroom were contingent less on the actual design of materials and more on how thoughtfully these were integrated and used by teachers and students in the classroom. The classroom usage portion of our review system is therefore comprised of open-ended questions that provide an opportunity for teacher/reviewers to envision how applications might best be used in the response-based classroom. Because the multimedia applications that we reviewed were primarily slated for use by an individual student, usage is potentially problematic for reader-based practices, where what is emphasized and valued develops out of a combination of individual reflection and interaction with others. However, when asked to consider possibilities for whole-class and pair use, reviewers were able to envision a variety of scenarios in which these materials could play a facilitative and supporting role in both individual and group processes around literature.

Outlined below is a breakdown of possible scenarios generated for the integration of multimedia applications into the reader-based classroom. These suggested uses are based on reviews of existing commercial applications in which teachers were asked to describe possible classroom uses for the applications they reviewed in conjunction with reports of field trials. Possible uses are organized by grade level (primary and secondary) and by the physical configuration proposed (individual, pair, whole class).

I. Elementary

A. Individual

1. Reviewers felt that the many talking-book applications available could play a catalytic role in motivating youngsters who are otherwise reticent to speak. This genre of application might also engage and empower individual children who may otherwise fail to be engaged with and empowered by what they read. Children in Chapter One, special education, and English as a second language (ESL) programs working individually might benefit from the opportunity to exercise their volition on the technology. Empowerment grows out of the fact that the individual learner can experience some direct, visible outcome to a physical action (e.g., lively pictures and audio sequences resulting from the click of the mouse). Enthusiasm and reactions to what happens in the story and on the screen could be capitalized on by instructors by encouraging discourse otherwise not possible with less verbal children.

Such benefits of the talking-book software with children with special challenges was documented by a speech teacher from a local school. Children with whom she had had tremendous difficulty conversing became animated and verbal when exploring sounds and graphics in an electronic storybook. Likewise, children for whom English is a second language were observed during trials to be motivated by the possibility to repeat individual words, phrases, and sentences at will so as to better understand the aural version of the story. ESL children were also observed talking to the screen, repeating back what they were hearing, and commenting on the pictures and animations to themselves. When interviewed, both the special needs students and the ESL learners reported enjoying the multimedia version of the story more than the text version. Being able to do something with what they were seeing, hearing, and reading was their favorite aspect. This "makes it fun," according to four ESL students who worked with talking-books on CD-ROM. Multimedia also seem to hold the attention of children who may be less predisposed to prolonged focus. Motivating sounds, graphics, and animations may not only engage them initially, but increase their time on task.

2. Electronic storybooks could also serve as supplemental lap-reading, something not all children have the opportunity to enjoy and benefit from. Multimedia could therefore be cast in the role of an enhanced reading center where individual reading and reflection could be undertaken.

3. Another role for the technology as a tool in an enhanced reading center could be to record and store students' voices. Such recordings—of either texts read aloud or spontaneous oral commentary—could be used for self-access and review, sharing with others, and/or as an evaluative instrument.

4. The few packages reviewed that had note-taking capabilities might be used to promote and support individual written responses to texts. Teacher/reviewers also proposed that, given multitasking operating systems, it would be possible to set up classroom computers so that

children could work with a multimedia storybook and a word processor at the same time. These kinds of individual responses might either be printed out and added to a response journal or kept in an on-line file for others to access and add comments to. The notion of a centralized communication station, one that children could use to reflect as individuals and respond as a community, was a very attractive concept among teacher/reviewers.

B. Pairs

1. The content and interactive features of multimedia storybooks could potentially motivate pair interaction around reading. Common interest in themes and characters as well as sharing connections between what is seen and heard and children's life experiences could be provoked. Pairs could work together to read and interact with the story. Constructive discourse around the literary experience would ideally result. Pairwork at a multimedia reading center or in a laboratory could be orchestrated by the teacher through task assignments (e.g., preparation of a report for the rest of the class), or children could use the time to develop their own cooperatively determined outcomes (e.g., a skit or collage based on the text).

2. Field trials with pairs of children for whom English is not the first language reveal great potential for peer interaction. Where the traditional language arts classroom can be an intimidating forum for expressing one's views in a foreign language, working with another child around a computer might render such activity relaxed and pleasurable.

C. Whole Class

1. Projected on a large screen, these electronic storybooks could be used by the teacher as the focal point during whole-class discussion. Images and sequences could provoke and support dialogue around the text, thus offering more-focused, expanded views and responses.

2. Individual or pairs of students who have independently developed a presentation or activity around the multimedia materials could use the large screen as their focal point.

II. Secondary

A. Individual

1. At the secondary level, several applications reviewed contain detailed background information regarding the literary work. Access to what might be unfamiliar information regarding the time and circumstances in which a work was written, for example, would benefit the individual student who may not otherwise have such access.

2. Because many secondary applications are designed as databases with large stores of background information supportive of the literary text, these might also be used by individual students as tools for research, either for a specific assignment or for an open-ended project of an individual student's own device. When using such materials for the first time, however, teachers noted the importance of guided assignments preceding more open-ended ones. Students, in other words, need to work in a guided manner while becoming familiar with an

application's possibilities. Once students were aware of what and how information could be accessed, assignments could become student-generated. As a database and research tool, the technology offers tremendous possibilities in this scenario. Given tools that allow students control over assembling materials as they wish, multimedia could also be used for individual students to present their thinking effectively to others.

3. As a tool for representing one's individual response to a text, multimedia technology offers an exciting outlet for the imagination. Notepad, annotation, and linking tools offer the individual student a means of portraying responses to a piece that are potentially richer than off-line means due to the technology's visual capability. As mentioned previously, even when such construction tools were unavailable in a given application, stations could be configured so that students could access text and graphics tools to use in consort with what the commercial application had to offer (e.g., the literary text with accompanying images and commentaries). As such, students could assemble and construct their personal meanings visually. These representations could then be shared with the class and/or made part of the course portfolio.

4. One field-test with *The Best of Edgar Allen Poe* revealed the benefits of an aural component. When the ninth grader being observed accessed the audio track that accompanied the text of the stories, his motivational level and task persistence clearly increased. His comments supported this observation: he found the text more accessible and interesting when accompanied by a dramatic reading.

B. Pairs

1. Undertaking the activities described in 1–4 above collaboratively might potentially enhance the sharing of ideas and experiences related to the literature under study. Conversation about the literary text could be enriched through the additional components multimedia offers: (1) supporting information in many formats and (2) tools with which to access and manipulate materials.

C. Whole Class

1. As described in this paper's preliminary scenario, multimedia technology functions particularly well as a presentation tool. For the teacher, supporting and provocative images—both still and moving—could be used with the entire class as a way to ease access before and while reading text. Likewise, individual students or groups could present their visual interpretations within the whole-class format using a multimedia presentation system.

The teacher's role in integrating and valuing multimedia's place in the classroom is critical. How and in what configuration hardware and software get used needs to be determined in light of individual instructors' goals and teaching styles. Understanding the

potential roles multimedia can play given the nature of software presently available is an important first step in considering a place for the technology in response-based contexts.

PROSPECTS

The impact of new technologies on literature learning and teaching is ultimately determined by how such systems impact classroom philosophies and practices. The current preponderance of commercial applications that reflect a singular reading—casting the machine in the role of deliverer and the learner in the role of passive recipient—would predict a parallel stance toward the study of literature in the classroom. This is a potentially risky situation, allowing technological disinvention to shape practice in the place of pedagogical invention. However, when the teacher thoughtfully casts the technology in a role that supports and enhances students' responses to a text rather than their uncritical acceptance of a sanctioned reading, we can see that it's not just the technology but the current software design paradigms that can support rather than contradict contemporary goals for learning.

While design approaches for multimedia are evolving to match the needs and goals of education, teacher perceptions concerning the multimedia technology and its potential remain critical; that is, successful integration of multimedia into response-based practices is less dependent on what the software itself can do, and more on what a class does with the media. Granted, our study reveals commercial software attributes that, for the most part, appear to contradict the underlying goals of response-based practice. In most cases, however, this contradiction can be overridden through teacher creativity and commitment to student-centered meaning-making rather than machine-centered knowledge.

In short, as a source of diverse information in a range of media, as a tool with which to think, talk about, and present developing understandings of texts, multimedia can be an asset and catalyst for the response-based classroom. Commercial applications to date lag behind current theory and practice, but can nonetheless be thoughtfully employed in ways that support the development of literary understandings and sociocognitive growth inherent in the process.

What remains to be accomplished are (1) development and systematic field-testing of those multimedia tools deemed desirable by teachers and their students; and (2) guidance for teachers in ways to enlist multimedia into their service so that the technology complements, rather than contradicts, their approaches to teaching and learning literature.

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